Notice of Allowability	Application No.	Applicant(s)	
	10/662,386	HAYASHI, KENJI	
	Examiner	Art Unit	
	Lana N. Le	2685	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *9/16/03*.

2. ☒ The allowed claim(s) is/are *1-33*.

3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☒ All b) ☐ Some* c) ☐ None of the:
      1. ☒ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

REASON FOR ALLOWANCE

1. Claims 1-33 are allowable over the cited prior art.

2. The following is an examiner's statement of reasons for allowance:

Regarding claim 1, Satoru (JP 2002-171137) discloses a high-frequency device (fig. 1) for handling a plurality of transmitting/receiving systems having different passbands comprising

(a) a branching circuit (DIP1) for branching higher-frequency signals and lower-frequency signals (para. 32),

(b) at least one switch circuit (SW1, SW2) connected to the branching circuit for switching connection to transmitting systems and receiving systems (para. 34),

(c) a plurality of high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose (d) a phase-adjusting circuit disposed between each of the switch circuits and each of the high-frequency amplifying circuits, wherein the phase matching between each of the switch circuits and each of the high-frequency amplifying circuits via the phase-adjusting circuit is adjusted to conjugate matching in a fundamental frequency band, while it is adjusted in a non-conjugate matching range in n-th frequency bands, wherein n is an integer of 2 or more.

Regarding claim 3, Satoru (JP 2002-171137) discloses a high-frequency module (fig. 1) for handling a plurality of transmitting receiving systems having different passbands, comprising:

(a) a switch module part (SW1, SW2) for branching higher-frequency signals and lower-frequency signals and switching connection to the transmitting systems and the receiving systems (para. 34),

b) a high-frequency amplifying circuit module part (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the module is constituted by an integral laminate comprising:

(c) a phase-adjusting circuit disposed between the switch module part and the high-frequency amplifying circuit module part, wherein the phase matching between the switch module part and the high-frequency amplifying circuit module part via the phase-adjusting circuit is adjusted to conjugate matching in a fundamental frequency band, while it is adjusted in a nonconjugate matching range in n-th frequency bands, wherein n is an integer of 2 or more.

Regarding claim 10, Satoru (JP 2002-171137) discloses high-frequency device (fig. 1) for handling a plurality of transmitting/receiving systems having different passbands comprising:

(a) a branching circuit (DIP1) for branching higher-frequency signals and lower-frequency signals (para. 32),

(b) at least one switch circuit (SW1, SW2) connected to the branching circuit for switching connection to transmitting systems and receiving systems (para. 34),

(c) a plurality of high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the high frequency device further comprising:

(d) a phase-adjusting circuit disposed between each of the switch circuits and each of the high-frequency amplifying circuits, wherein a phase of an impedance Z2 of each of the switch circuits when viewed from a connection reference plane between each of the switch circuits and each of the high-frequency amplifying circuits is adjusted to a range of -125° to +90° in a fundamental frequency band.

Regarding claim 11, Satoru (JP 2002-171137) discloses a high-frequency device for handling a plurality of transmitting/receiving systems having different passbands comprising

(a) a branching circuit (DIP1) for branching higher-frequency signals and lower-frequency signals (para. 32),

(b) at least one switch circuit (SW1, SW2) connected to the branching circuit for switching connection to transmitting systems and receiving systems (para. 34),

(c) a plurality of high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the high frequency device is constituted by an integral laminate comprising:

(d) a phase-adjusting circuit disposed between each of the switch circuits and each of the high-frequency amplifying circuits, wherein a phase of an impedance Z2 of each of the switch circuits when viewed from a connection reference plane between each of the switch circuits and each of the high-frequency amplifying circuits is adjusted in a conjugate matching range within $\theta 1 + 90°$ in a fundamental frequency band, the being conjugate to a phase θ of an impedance Z1 of each of the high-frequency amplifiers when viewed from the connection reference plane.

Regarding claim 12, Satoru (JP 2002-171137) discloses a high-frequency device (fig. 1) for handling a plurality of transmitting/receiving systems having different passbands comprising:

(a) a branching circuit (DIP1) for branching higher-frequency signals and lower-frequency signals (para. 32),

(b) at least one switch circuit (SW1, SW2) connected to the branching circuit for switching connection to transmitting systems and receiving systems (para. 34),

(c) a plurality of high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the high frequency device further comprising:

(d) a phase-adjusting circuit disposed between each of the switch circuits and each of the high-frequency amplifying circuits, wherein a phase θ2 of an impedance Z2 of each of the switch circuits when viewed from a connection reference plane between each of the switch circuits and each of the high-frequency amplifying circuits is adjusted in a conjugate matching range within θ1 + 90° and in a range of -125° to +90° in a fundamental frequency band, the θ1 being conjugate to a phase θ of an impedance Z1 of each of the high-frequency amplifiers when viewed from the connection reference plane.

Regarding claim 13, Satoru (JP 2002-171137) discloses a high-frequency module (fig. 1) for handling a plurality of transmitting and receiving systems having different passbands, comprising:

(a) a switch module part (DIP1, SW1, SW2) for branching higher-frequency signals and lower-frequency signals via DIP1 and switching connection via to the transmitting systems and the receiving systems (para. 32, 34),

(b) a high-frequency amplifying circuit module parts (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) by phase adjusting high harmonic spurious frequencies (para. 54). However, Satoru and the cited prior art fail to disclose the module is constituted by an integral laminate comprising:

(c) a phase-adjusting circuit disposed between the switch module part and the high-frequency amplifying circuit module part wherein a phase θ2 of an impedance Z2 of the switch module part when viewed from a connection reference plane between the

high-frequency amplifying circuit module part and the switch module part is adjusted to a range of -125° to +90° in a fundamental frequency band by the phase-adjusting circuit.

Regarding claim 14, Satoru (JP 2002-171137) discloses a high-frequency module for handling a plurality of transmitting/receiving systems having different passbands, comprising:

(a) a switch module part (DIP1, SW1, SW2) for branching higher-frequency signals and lower-frequency signals and switching connection to the transmitting systems and the receiving systems (para. 32, 34),

(b) a high-frequency amplifying circuit module part, and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the high frequency module is constituted by an integral laminate comprising:

(c) a phase-adjusting circuit disposed between the switch module part and the high-frequency amplifying circuit module part, wherein a phase $\theta 2$ of an impedance Z2 of the switch module part when viewed from a connection reference plane between the switch module part and the high-frequency amplifying circuit module part is adjusted in a conjugate matching range within $\theta 1$ +- 90° in a fundamental frequency band by the phase-adjusting circuit, the $\theta 1$ being conjugate to a phase θ of an impedance Z1 of the high-frequency amplifying circuit module part when viewed from the connection reference plane.

Regarding claim 15, Satoru (JP 2002-171137) discloses a high-frequency module (fig. 1) for handling a plurality of transmitting/receiving systems having different passbands, comprising

(a) a switch module part (DIP1, SW1, SW2) for branching higher-frequency signals and lower-frequency signals and switching connection to the transmitting systems and the receiving systems (paras. 32, 34),

(b) a high-frequency amplifying circuit module part (AMP1, AMP2) (para. 35), However, Satoru and the cited prior art fail to disclose the module is constituted by an integral laminate comprising:

(c) a phase-adjusting circuit disposed between the switch module part and the high-frequency amplifying circuit module part, wherein a phase of an impedance Z2 of the switch module part when viewed from a connection reference plane between the switch module part and the high-frequency amplifying circuit module part is adjusted in a conjugate matching range within $\theta 1 + 90°$ and in a range of -125° to +90° in a fundamental frequency band by the phase-adjusting circuit, the $\theta 1$ being conjugate to a phase θ of an impedance Z1 of the high-frequency amplifying circuit module part when viewed from the connection reference plane.

Regarding claim 16, Satoru (JP 2002-171137) discloses a high-frequency device (fig. 1) for handling a plurality of transmitting/receiving systems having different passbands comprising:

(a) a branching circuit (DIP1) for branching higher-frequency signals and lower-frequency signals (para. 32),

(b) at least one switch circuit ((SW1, SW2) connected to the branching circuit for switching connection to transmitting systems and receiving systems (para. 34),

(c) a plurality of high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose:

(d) a phase-adjusting circuit disposed between each of the switch circuit and each of the high-frequency amplifying circuits, wherein a phase θ2 of an impedance Z2 of each of the switch circuits when viewed from a connection reference plane between each of the switch circuits and each of the high-frequency amplifying circuits is adjusted by the phase-adjusting circuit, (1) in a conjugate matching range within θ1 +-90° and in a range of -125° to +90° in a fundamental frequency band, and (2) in a nonconjugate matching range within +-120° (θ0 +-120°) from a phase θ0 opposite to a phase θ1 by 180° in n-th frequency bands, wherein n is an integer of 2 or more, the θ1 being conjugate to a phase θ of an impedance Z1 of each of the high-frequency amplifiers when viewed from the connection reference plane.

Regarding claim 17, Satoru (JP 2002-171137) discloses a high-frequency module (fig. 1) for handling a plurality of transmitting/receiving systems having different passbands, comprising:

(a) a switch module part (DIP1, SW1, SW2) for branching higher-frequency signals and lower-frequency signals and switching connection to the transmitting systems and the receiving systems (paras. 32, 34),

(b) a high-frequency amplifying circuit module part (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the module is constituted by an integral laminate comprising:

(c) a phase-adjusting circuit disposed between the switch module part and the high-frequency amplifying circuit module part, wherein a phase θ2 of impedance Z2 of the switch module part when viewed from a connection reference plane between the switch module part and the high-frequency amplifying circuit module part is adjusted by the phase-adjusting circuit, (1) in a conjugate matching range within θ1 +- 90° and in a range of -125° to +90° in a fundamental frequency band, and (2) in a nonconjugate matching range within +- 120° (θ0 +-120°) from a phase θ0 opposite to a phase θ1 by 180° in n-th frequency bands, wherein n is an integer of 2 or more, the θ1 being conjugate to a phase θ of an impedance Z1 of the high-frequency amplifying circuit module part when viewed from the connection reference plane.

Regarding claim 30, Satoru (JP 2002-171137) discloses a high-frequency device (fig. 1) comprising high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and high-frequency circuits (SW1, SW2) disposed downstream of the high-frequency amplifying circuits for treating a high-frequency signal amplified by the high-frequency amplifying circuit (para. 34), the amplifiers are integrated with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54). However, Satoru and the cited prior art fail to disclose:

the amplifiers and high frequency circuits are connected to each other via a phase-adjusting circuit, wherein a phase θ2 of an impedance Z2 of each of the downstream high-frequency circuits when viewed from a reference point of the phase-adjusting circuit on the side of the high-frequency amplifying circuit is adjusted within 0c + 1200 in a frequency that is n times (n is an integer of 2 or more) the fundamental frequency of the high-frequency signal, the θ0 being an opposite phase to a phase θ1, which is conjugate to a phase θ of an impedance Z1 of the high-frequency amplifying circuit when viewed from the reference point.

Regarding claim 32, Satoru (JP 2002-171137) discloses a communications device (fig. 1) for transmitting and receiving two or more signals having different frequencies via one common antenna (ANT), the common antenna being connected to a high-frequency device comprising

(a) a branching circuit (DIP1) for branching higher-frequency signals and lower-frequency signals (para. 32),

(b) at least one switch circuit (SW1, SW2) connected to the branching circuit for switching connection to transmitting systems and receiving systems (para. 34),

(c) a plurality of high-frequency amplifying circuits (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the communication device comprising:

(d) a phase-adjusting circuit disposed between each of the switch circuits and each of the high-frequency amplifying circuits, wherein the phase matching between each of the switch circuits and each of the high-frequency amplifying circuits via the phase-adjusting circuit is adjusted to conjugate matching in a fundamental frequency band, while it is adjusted in a nonconjugate matching range in n-th frequency bands, wherein n is an integer of 2 or more.

Regarding claim 33, Satoru (JP 2002-171137) discloses a communications device (fig. 1) for transmitting and receiving two or more signals having different frequencies via one common antenna (ANT), the common antenna being connected to a high-frequency module, the high-frequency module comprising

(a) a switch module part (DIP1, SW1, SW2) connected to said branching circuit for switching connection to transmitting systems and receiving systems for branching higher-frequency signals and lower-frequency signals and switching connection to the transmitting systems and the receiving systems (paras. 32, 34),

(b) a high-frequency amplifying circuit module part (AMP1, AMP2) (para. 35), and integrating the amplifiers with couplers (COP1, COP2) via nonconjugate matching by phase adjusting high harmonic spurious frequencies (para. 54).

However, Satoru and the cited prior art fail to disclose the device is constituted by an integral laminate comprising:

(c) a phase-adjusting circuit disposed between the switch module part and the high-frequency amplifying circuit module part, wherein the phase matching between the switch module part and the high-frequency amplifying circuit module part via the phase-

adjusting circuit is adjusted to conjugate matching in a fundamental frequency band, while it is adjusted in a nonconjugate matching range in n-th frequency bands, wherein n is an integer of 2 or more.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- Karlsson Et Al (US 2005/0,146,392) Transmit Receive Switch with High Power Protection.

- Rowland (US 6,006,111) Self-Balancing Matrix Amplifier

- Mullins Et Al (US 5,771,016) Phased Array Radar with Simultaneous Beam-Steering and Single-Sideband Modulation

- Feldle (US 5,446,464) Transceiver Module.

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lana N. Le whose telephone number is (571) 272-7891. The examiner can normally be reached on M-F 9:00-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on (571) 272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lana N. Le

Lana N. Le
02-05-06
LANA LE
PRIMARY EXAMINER